

RECLAMATION

Managing Water in the West

2013 Green River Peak Flows Entrain Razorback Sucker Larvae in Stewart Lake Wetland

**Bureau of Reclamation
Upper Colorado Regional Office**



**U.S. Department of the Interior
Bureau of Reclamation**

43

Manila

Flaming
Gorge
Dam

Dutch John

Flaming Gorge
National
Recreation
Area

RM 410.0

Little Hole

Green River

Sw



Whirlpool Canyon

Rainbow Park

Split Mountain

Dinosaur National
Monument

Echo Park

Yampa River

Vernal

Spawning Bars

40

Duchesne River

Ouray National
Wildlife Refuge

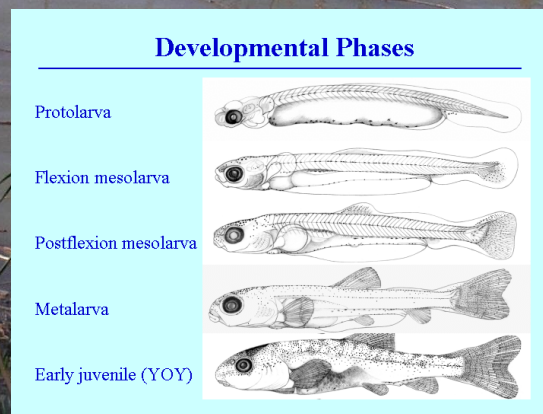
Ouray

Uintah and Ouray
Ute Tribal Land

RM 246.2



2013 Objective: Time Flaming Gorge releases to connect floodplains when wild produced razorback sucker larvae are present in the Green River



Flaming Gorge Dam Peak

Timing
Duration
Magnitude



Yampa River Peak

Timing
Duration
Magnitude

Floodplain type/inundation threshold

Flow-through vs. single breach, high/low elevation

RZB larval drift
temperature

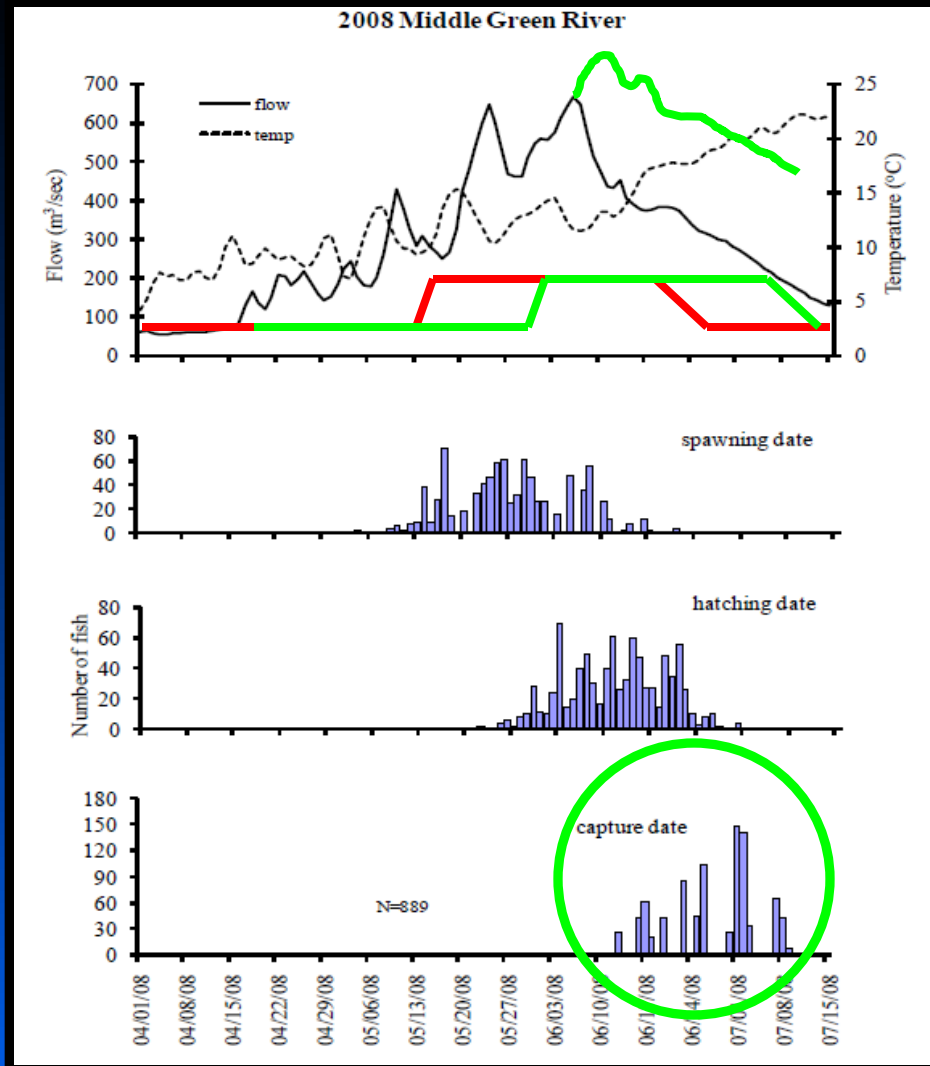


Larval Entrainment

Peaks in drift and river flow were temporally mismatched in most years (1992 – 2010)

Flaming
Gorge
Dam
release

Idealized
release
under LTSP
matching
Yampa peak
or
immediate
post-peak



RECLAMATION

Recovery Program Research Request

Larval Trigger Study Plan

Peak Flow (x) as Measured at Jensen, Utah	Proposed Study Wetlands ^(a, b)	Number of Days (x) Flow to Be Exceeded and Corresponding Hydrologic Conditions ^(c)		
		$1 \leq x < 7$	$7 \leq x < 14$	$x \geq 14$
$8,300 \leq x < 14,000$ cfs	Stewart Lake (f), Above Brennan (f), Old Charley Wash (s)	Dry	Moderately dry	Moderately dry and average (below median)
$14,000 \leq x < 18,600$ cfs	Same as previous plus Thunder Ranch (f), Bonanza Bridge (f), Johnson Bottom (s), Stirrup (s), Leota 7 (s)	Average (below median)	Average (below median)	Average (below median)
$18,600 \leq x < 20,300$ cfs	Same as previous	Average (above median)	Average (above median)	Average (above median)
$20,300 \leq x < 26,400$ cfs	Same as previous plus Baeser Bend (s), Wyasket (s), additional Leota units (7a and 4), Sheppard Bottom (s)	Moderately wet	Moderately wet	Moderately wet
$x \geq 26,400$ cfs	Same as previous	Wet	Wet	Wet

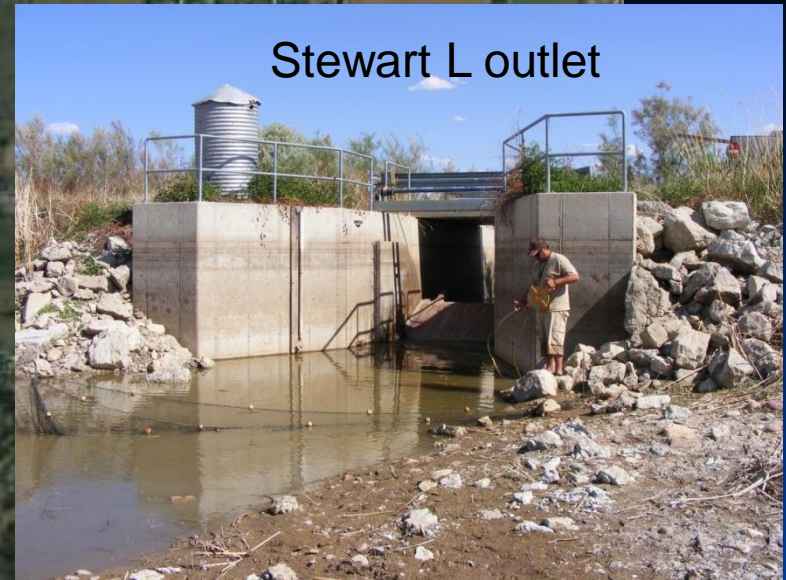
(a) f = flow-through wetland, s = single-breach wetland

(b) Up to eight wetlands would be sampled in a given year with the three in the lowest flow category being sampled in all years.

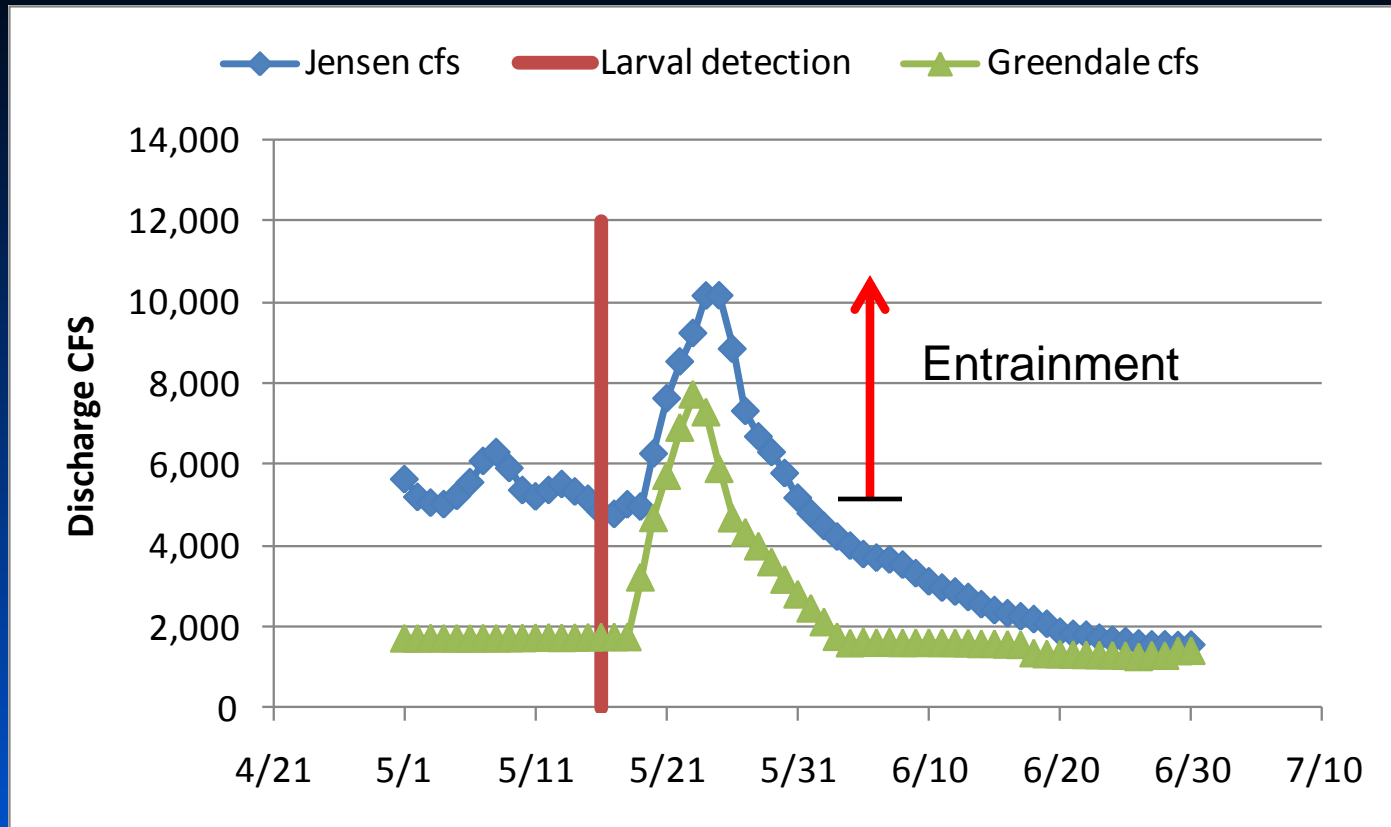
(c) Refer to Table 1 for exceedance percentages and peak flow recommendations for each hydrologic condition. Note that the hydrologic conditions presented are the driest that could support a particular combination of peak flow magnitude and duration. For any combination, wetter hydrology could also support an experiment.

RECLAMATION

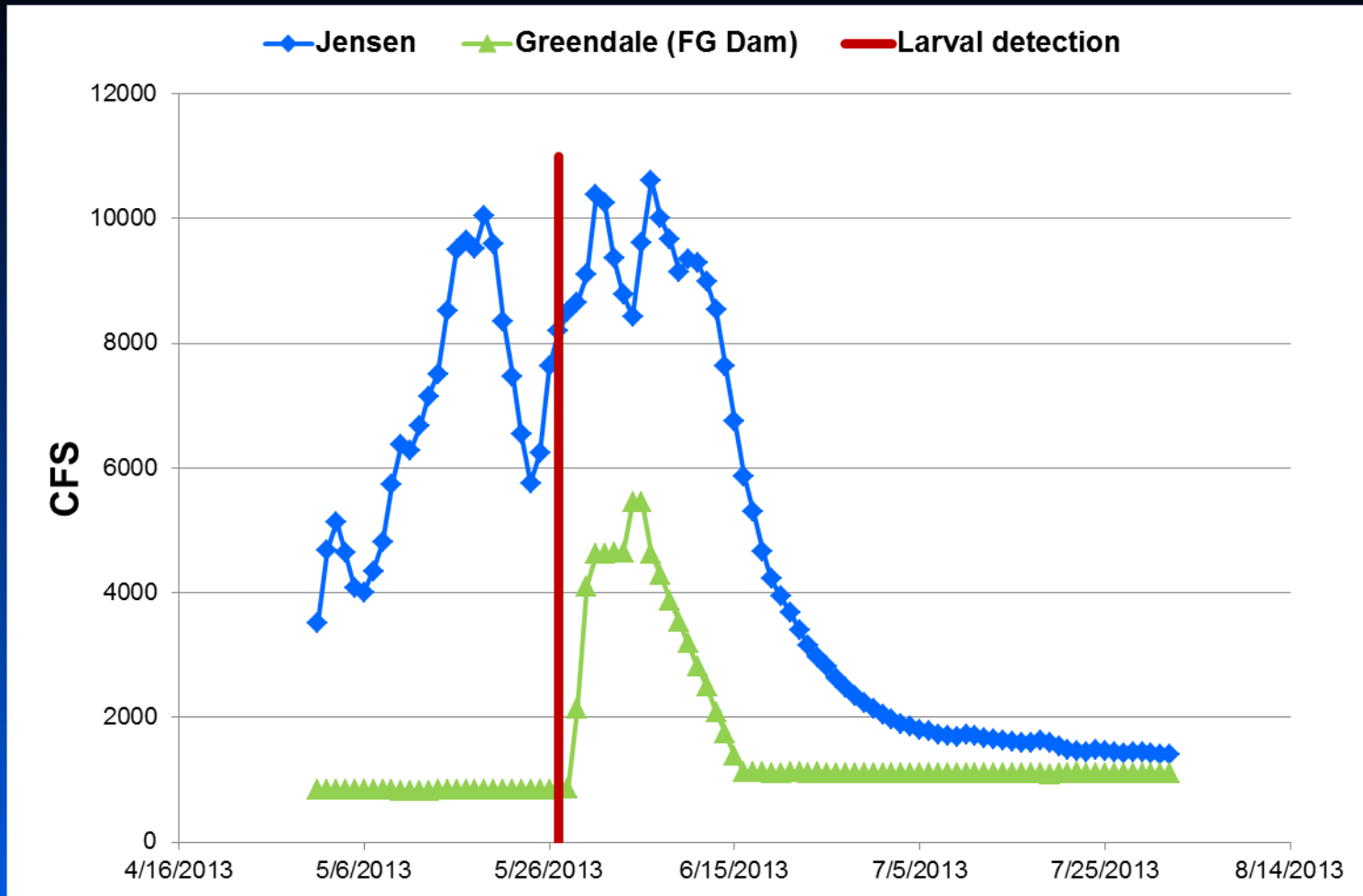
Stewart Lake inundates at $\geq 5,000$ cfs through its outlet gate



Spring Peak Flows 2012



Spring Peak Flows 2013



RECLAMATION

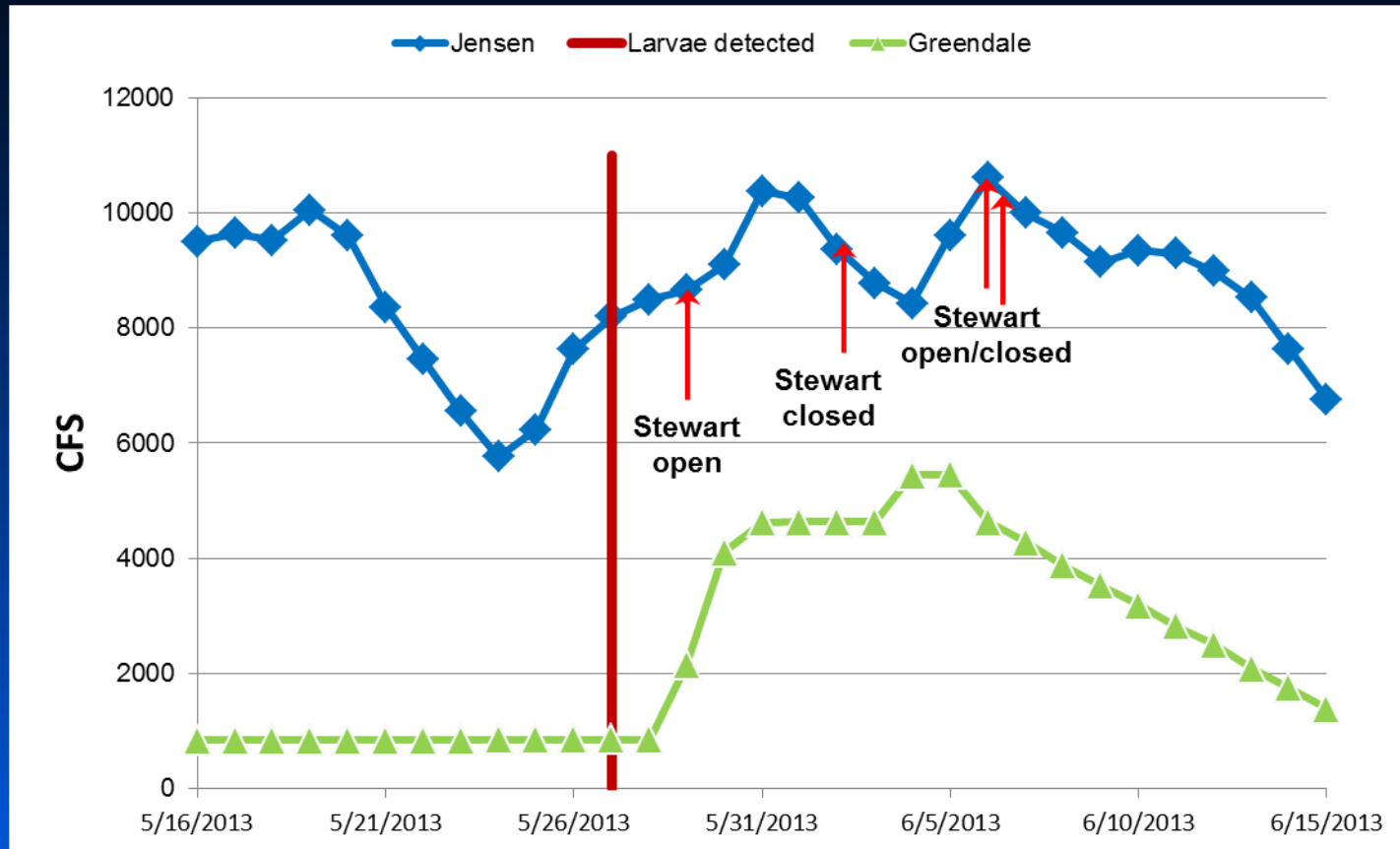
2013 Chronology

- Early May: USFWS/UDWR personnel begin light trapping for larval razorback sucker in floodplain wetland habitats. Hydrologic classification for Green and Yampa basins is moderately dry.
- May 27: USFWS reports larval razorback sucker detected in samples from three separate wetland habitats in the Jensen/Ouray reach.
- May 29: UDWR opens outlet gates to Stewart Lake which entrains large numbers of razorback sucker larvae into Stewart Lake.
- May 30: FG dam discharge is raised to powerplant capacity (~4,600 cfs) with the option to add bypass flows if the Yampa River declines below 4,000 cfs to meet objectives.
- June 2: Declining flows prompt closure of Stewart Lake gates to conserve water and larvae already entrained.

2013 Chronology, continued

- June 3: Yampa River declines to 3,360 cfs; BOR announces it will release bypass flows to maintain flows at or above 8,300 cfs in Jensen for 7-14 days during larval drift period.
- June 4: FG dam releases increase to about 5,500 cfs for two days.
- June 6: Stewart Lake gates re-opened for 12 hours to receive second pulse of water (slightly higher than first) from combined Yampa/Green River flows, including FG bypass flows.
- August 8: Dwindling water supplies prompts UDWR to drain Stewart Lake and release razorback sucker into the Green River. A total of 611 wild-spawned young-of-year razorback sucker (ranging from 40-85 mm) leave the wetland.
- An additional 145 fish were found dead in the lake after operations ceased, representing an 81% recovery rate.

Stewart Lake Operations—detail





CLAMATION



Stewart Lake suckers grew from 20-23 mm to 40-86 mm in slightly less than 2 months, doubling or tripling in size



Conclusions

- Excellent real-time coordination between USFWS, UDWR, BOR, and others on implementation of flow proposal in response to larval presence and rising/falling water levels to maximize entrainment 😊.
- Entrainment of larvae into Stewart Lake (and presumably other wetlands) successful as a result of flow coordination and monitoring 😊.
- Over 600 wild-spawned razorback sucker survived and grew in Stewart Lake and were returned to the Green River 😊.
- LTSP/ROD moderately dry objectives achieved or exceeded (about 18 days at or above 8,300 cfs during larval drift) 😊.

Uncertainties

- **Water availability for Stewart Lake during dry years**
 - **Selenium remediation**
 - **Tradeoffs**

RECLAMATION



Questions

Thanks to Joe Skorupski, UDWR for photos and info

RECLAMATION